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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,533	10/16/2003	Oliver Luz	10191/3405	2134

26646 7590 06/14/2006

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EXAMINER	
MURALIDAR, RICHARD V	

ART UNIT	PAPER NUMBER
2838	

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,533	LUZ ET AL.	
	Examiner	Art Unit	
	Richard V. Muralidar	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

NON-FINAL ACTION

The previously indicated allowability of claim 4 is withdrawn in view of the newly found reference to Marusak et al. [U.S. 2004/0048142]. Rejections based on the previous references by Ng et al. [U.S. 6320351], Larson [U.S. 6690140], McRoberts [U.S. 4965461], Perhats [U.S. 6116513], Kelwaski [U.S. 2003/0107863], and Baer [U.S. 5701068] stand as previously indicated in the first Detailed Action, with corresponding responses to applicant's amendments and arguments given below.

Additionally, rejections based on the newly cited reference to Marusak et al. [U.S. 20040048142] follow.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 [currently amended] is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 states "...a positive terminal of the battery..." and "...a terminal at which a generator is connectable..." and "...a battery disconnecting fuse situated between the battery and the terminal...". It is unclear exactly which terminals the battery disconnecting switch and the battery disconnecting fuse are located between. The amended language of Claim 1 has been interpreted to mean the fuse and switch are located between the battery positive terminal and the terminal of the generator, and the prior art has been applied accordingly. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) The invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Marusak et al [U.S. 20040048142].

With respect to Claim 1 [Currently Amended], Marusak teaches a vehicle electrical system [par. 0001] powered by a battery [Fig. 1 battery 12] to supply a plurality of loads [par. 0011 lines 1-4; par. 0033 lines 1-5; Fig. 2 power feed output connectors 80, 82, 84, 86], comprising: an integrated module [Fig. 1, power management and distribution assembly 10] positioned between a positive terminal of the battery and the plurality of loads [par. 0031 lines 1-5], the integrated module having an arrangement for detecting a state of charge of the battery [par. 0010 lines 1-5] and including a battery current measuring device [par. 0030 lines 1-6], and a terminal at which a generator is connectable [Fig. 2, the generator/alternator connects to either the battery positive terminal 16 or any of the power output connectors 80, 82, 84, 86] : one of a battery disconnecting switch [Fig. 2, cutout switch assembly 58] and a battery disconnecting fuse [Fig. 5, fuses 70]; par. 0008 lines 1-5; par. 0011 lines 1-4; par. 0031 lines 1-5] situated between the battery and the terminal: a control unit for power management

[Fig. 5, energy management module 56] of the vehicle electrical system, and at least one supply output for supplying power to the loads [par. 0034].

With respect to Claim 4 [Currently Amended], Marusak teaches A vehicle electrical system [par. 0001] powered by a battery [Fig. 1 battery 12] to supply a plurality of loads [par. 0011 lines 1-4; par. 0033 lines 1-5; Fig. 2 power feed output connectors 80, 82, 84, 86] comprising: an integrated module [Fig. 1, power management and distribution assembly 10] positioned between a positive terminal of the battery and the plurality of loads [par. 0031 lines 1-5], the integrated module having an arrangement for detecting a state of charge of the battery [par. 0010 lines 1-5], a control unit for power management [Fig. 5, energy management module 56] of the vehicle electrical systems and at least one supply output [par. 0034] for supplying power to the loads, the vehicle electrical system further comprising a battery temperature sensor located outside the integrated module, wherein the arrangement for detecting the state of charge of the battery includes a battery temperature meter that cooperates with the battery temperature sensor [par. 0030 teaches that the energy management module 56 has an interface for CAN inputs, including temperature sensing, and outputs which are then sent to the vehicle's dashboard, i.e. meters. This includes temperature meters such as those prevalent in electric vehicles where it is necessary to monitor the temperature of the vehicle battery pack].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103[a] which forms the basis for all obviousness rejections set forth in this Office action:

> [a] A patent may not be obtained though the invention is not identically teach or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al [U.S. 6320351] in view of Larson [U.S. 6690140] and McRoberts et al. [4965461].

With respect to Claim 1 [currently amended], Ng teaches a vehicle electrical system [Fig. 1, vehicle electrical system 14] powered by a battery [Fig. 7, batteries 12 and 14] to supply a plurality of loads [Fig. 7, ignition 20, head lights 22, and accessories 24], comprising: an integrated module [Fig. 7, the combination of battery voltage monitor 36 and power management unit 38 modules; also see paragraph on integrated module below] positioned between a positive terminal of the battery and the plurality of loads, the integrated module having an arrangement for detecting a state of charge of the battery [Fig. 7, battery voltage monitor 36, col. 4 lines 27-29] and including a battery current measuring device [Ng does not teach a battery current measuring device], and a terminal at which a generator is connectable [Fig. 7, generator 16 is connected through the starting latch relay 30A and 30B terminals to the battery voltage monitor 36 and the power management unit 38 modules]; one of a battery disconnecting switch [Fig. 7, starting latching relay 30A], situated between the battery and the terminal; a control unit for power management of the vehicle electrical system [Fig. 7, power management unit 38, col. 4 lines 22-29], and at least one supply output for supplying

power to the loads [Fig. 3, battery positive terminal 13A, or latching relay 30 is the point of attachment for loads; col. 4 lines 27-29 with vibration detection unit as load].

Ng does not teach a battery current measuring device and a battery disconnecting fuse, although it is understood that all of these components are a part of a vehicle's electrical system, whether by themselves or part of a module. Ng primarily differs from claimed invention in that battery voltage monitor 36 and power management unit 38, in combination with the switch, fuse, and supply output are not specified in *one* integrated module.

Larson teaches the arrangement for detecting the state of charge of a battery includes a battery current meter [Abstract, lines 13-16 refers to instrumentation, and Fig. 1, gauge cluster 14]. In the context of a vehicle's electrical battery charging system, it is understood that a current meter is both a type of instrumentation and a gauge, and is a standard component of many vehicle electrical systems' instrumentation packages/ gauge clusters.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add an instrument/ gauge, specifically a battery current meter, to Ng for the benefit of providing a visual means of determining the rate of current charging and current discharging from the battery, and also to assist in troubleshooting of the vehicle electrical system.

McRoberts teaches a battery-disconnecting switch and a battery-disconnecting fuse [Fig. 2, switches 66, 68, and 70 connected to fuse block 64] shown in one module [Fig. 2, control system 14].

At the time of the invention it would have been obvious to a person having ordinary skill in the art to combine the switches 66, 68, and 70 with the fuse block into the modules containing the battery voltage monitor/ power management unit [i.e. one integrated module to contain them all] to create a module that is both fused and switched with at least one supply output for supplying power to the loads for the benefit of easy and simultaneous replacement of a blown fuse or defective switch. This is advantageous because when a circuit short circuits or overloads, many of the components in that circuit, including the fuse, the switch, and any controllers and loads connected to that circuit become damaged as well. Integration would allow for easy removal and replacement of all of the affected components simultaneously, with obvious cost and time saving benefits to both the vehicle owner and the repairer.

The following applies to the placement of ALL of the above limitations of amended Claim 1 into one integrated module:

1. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the battery voltage monitor 36 and power management unit 38 [Fig. 7, depicted as individual modules] with a positive output terminal into one integral module to create an arrangement for detecting a state of charge of the battery, a control unit for power management of the vehicle electrical system, and at least one supply output for supplying power to the loads; since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. ***In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 [CCPA 1965]. See MPEP 2144.04.***

2. Applicant's invention is understood to be essentially forming a battery current meter, a battery-disconnecting switch, a battery-disconnecting fuse, a power management control unit, a terminal connectable to a generator, and a supply output, into one integrated module for a vehicle electrical system. According to MSN Encarta, a module is a: *self-contained interchangeable unit: an independent unit that can be combined with others and easily rearranged, replaced, or interchanged to form different structures or systems.* By this definition, all of these components are themselves modules, and most of them are a part of other modules. Taking components from multiple different modules commonly found in ALL vehicles' electrical systems and placing them into one module does not constitute new patentable material.

3. The ease, prevalence [the automotive industry is one of the biggest users of modularization], and advantages [the economic incentives of modularization are well known and include reduced manufacturing costs, ease of removal, replacement, testing, and repair, and increased reliability, to name a few] of modularization are notoriously well known in the automotive industry. With techniques commonly available today, anyone can modularize almost anything or any number of components into an integrated module without any difficulty.

Claims 2-3 stand rejected as given in the previous Detailed Action and in view of the arguments to amended Claim 1 above, and are repeated below.

Claims 2-3 are rejected under 35 U.S.C. 103[a] as being obvious over Ng et al [US 6320351] in view of Larson [US 6690140].

With respect to Claim 2, Ng discloses the vehicle electrical system as recited in Claim 1, and an arrangement for detecting the state of charge of the battery, as a battery voltage monitor. Ng does not specifically disclose a battery current meter.

Larson discloses the arrangement for detecting the state of charge of a battery includes a battery current meter [Abstract, lines 13-16 refers to instrumentation, and Fig. 1 gauge cluster 14]. In the context of a vehicle's electrical battery charging system, it is understood that a current meter is both a type of instrumentation and a gauge, and is a standard component of many vehicle electrical systems' instrumentation packages/ gauge clusters.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add an instrument/ gauge, specifically a battery current meter, to Ng.

The suggestion/ motivation for doing so would have been to provide a visual means of determining the rate of current charging and current loss from the battery, and also to assist in electrical troubleshooting.

With respect to Claim 3, Ng discloses the vehicle electrical system as recited in Claim 1. Ng does not disclose a battery voltage sensor and a battery voltage meter.

Larson discloses a vehicle electrical system comprising a battery voltage sensor [Fig. 2 element 46, and col. 4 lines 59-61] located outside the integrated module, wherein the arrangement for detecting the state of charge of the battery includes a battery voltage meter [col. 4 lines 52-54 instrumentation, and Fig. 1 gauge cluster 14

includes the voltage meter] that cooperates with the battery voltage sensor. In the context of a vehicle's electrical battery charging system, it is understood that a voltage meter is both a type of instrumentation and a gauge, and is a standard component of many vehicle electrical systems' instrumentation packages/ gauge clusters.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add an instrument/ gauge, specifically a battery voltage meter, to Ng.

The suggestion/ motivation for doing so would have been to provide a visual means of determining the rate of voltage rise and voltage drop across the battery caused by charging and discharging, and also to assist in electrical troubleshooting.

Claim 4 is rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al. [U.S. 6320351] in view of Marusak et al. U.S. [2004/0048142]

With respect to Claim 4 [amended], Ng teaches a vehicle electrical system [Fig. 1, vehicle electrical system 14] powered by a battery [Fig. 7, batteries 12 and 14] to supply a plurality of loads [Fig. 7, ignition 20, head lights 22, and accessories 24], comprising: an integrated module [Fig. 7, the combination of battery voltage monitor 36 and power management unit 38 modules; also see Claim 1 paragraphs concerning integrated module] positioned between a positive terminal of the battery and the plurality of loads, the integrated module having an arrangement for detecting a state of charge of the battery [Fig. 7, battery voltage monitor 36, col. 4 lines 27-29], a control unit for power management [Fig. 7, power management unit 38, col. 4 lines 22-29] of the vehicle electrical system, and at least one supply output [Fig. 3, battery positive

terminal 13A, or latching relay 30 is the point of attachment for loads; col. 4 lines 27-29 with vibration detection unit as load] for supplying power to the loads.

Ng does not teach a battery temperature meter that cooperates with a battery temperature sensor.

Marusak teaches a vehicle electrical system with battery temperature sensor located outside the integrated module, wherein the arrangement for detecting the state of charge of the battery includes a battery temperature meter that cooperates with the battery temperature sensor [par. 0030 teaches that the energy management module 56 has an interface for CAN inputs, including temperature sensing, and outputs which are then sent to the vehicle's dashboard, i.e. instrument meters. This includes temperature meters such as those prevalent in electric vehicles where it is necessary to monitor the temperature of the vehicle's battery pack].

At the time of the invention it would have been obvious to one of ordinary skill in the art to have provide a means of sensing the temperature of the battery and relaying that information to the vehicle's driver [regardless of whether it was part of an integrated power management module or by itself] for the purpose of updating the driver with critical information regarding the status of the battery, which affects both its charging as well as its safety (too high a temperature could indicate pending overload].

Claims 5-18 stand rejected as given in the previous Detailed Action and in view of the arguments to amended Claim 1 above, and are repeated below.

Claims 5-8 are rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al [U.S. 6320351] in view of McRoberts [U.S. 4965461].

With respect to Claim 5, Ng discloses the vehicle electrical system as recited in claim 1. However, Ng does not disclose a fuse module with an input and plurality of outputs, an integrated module connected to the input of the fuse module, or fuse module outputs supplying power to the loads.

McRoberts discloses a vehicle electrical system comprising: a fuse module [Fig. 1, fuse block 64] having an input, a plurality of supply outputs, and a plurality of fuses that connect the plurality of supply outputs to the input [Fig. 1 input connection from battery, outputs through elements 66, 68, 70]; wherein a terminal of the integrated module is connected to the input of the fuse module [this is the standard practice in the automobile industry of protecting all valuable loads with a fuse or circuit breaker] and wherein the plurality of supply outputs of the fuse modules provide power to the plurality of loads [again standard practice to supply multiple loads from a fuse module/ block].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a fuse module with supply outputs to Ng.

The suggestion/ motivation for doing so would have been to provide a means of overload protection for the integrated module, as well as the loads supplied by the integrated module. This is common practice for all valuable vehicle loads.

With respect to Claim 6, Ng further does not disclose a switch within the fuse module that enables connection and disconnection between one of a plurality of fuses and an associated load.

McRoberts discloses a vehicle electrical system comprising: a switch provided within the fuse module [Fig. 1 switches 66, 68, and 70 shown in the vicinity of fuse module 64], wherein the switch enables selective connection and disconnection between at least one of the plurality of fuses and an associated load [switches 66, 68 and 70 connects/ disconnects loads 52 and 53 from fuse block 64]. McRoberts differs from claimed invention in that switch elements 66, 68 and 70 are not specified as integrated into the fuse module.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the switches 66, 68, and 70 with the fuse block into one integrated module to create an arrangement that is both fused and switched [and capable of easy, simultaneous replacement] with at least one supply output for supplying power to the loads; since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. ***In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 [CCPA 1965]. See MPEP 2144.04.***

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a switched fuse module with supply outputs to Ng.

The suggestion/ motivation for doing so would have been to provide a means of switching the fuse module right at its own location. This would be advantageous as a means of convenience to the user, as fuses often melt at the moment the load is switched on.

With respect to Claim 7, Ng discloses the vehicle electrical system as recited in Claim 1. However, Ng does not disclose a plurality of fuses from the integrated module that connects the supply outputs to the battery.

McRoberts discloses a vehicle electrical system comprising: a plurality of fuses [Fig. 1 fuse block 64]; wherein the integrated module has a plurality of supply outputs, and wherein the plurality of fuses connect the plurality of supply outputs to the battery [Fig. 1, outputs from 66, 68, and 70 with connection to battery 18], whereby power is provided via the plurality of supply outputs to the plurality of loads [Fig. 1, instrument lights 52 and compartment lights 53].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a plurality of fuses connecting a plurality of supply outputs to Ng.

The suggestion/ motivation for doing so would have been to provide a means of overload protection for the loads supplied by the battery monitor/ power management integrated module.

With respect to Claim 8, Ng discloses the vehicle electrical system as recited in Claim 7. Ng also discloses a switch provided within the integrated module [Fig. 4 switch 30, shown in the vicinity of the battery voltage monitor and power management unit. One of ordinary skill in the art can easily combine the switch with the battery monitor/ power management unit module see, claim 1 argument, for the purpose of creating a single integrated unit]. However, Ng does not disclose a switch within the integrated module, wherein the switch enables selective connection and disconnection between at least one of the plurality of fuses and an associated load.

McRoberts discloses a vehicle electrical system comprising: a switch, wherein the switch enables selective connection and disconnection between at least one of the plurality of fuses and an associated load [McRoberts: switches 66, 68 and 70 connects/ disconnects loads 52 and 53 from fuse block 64].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add McRoberts' switch that enables selective connection and disconnection between at least one of the plurality of fuses and an associated load, to Ng.

The suggestion/ motivation for doing so would have been to provide a means of switched overload protection for the loads supplied by the battery monitor/ power management integrated module. Placing the switch near the fuses would be a matter of convenience to the user, as fuses often melt at the moment the load is switched on.

Claim 9 is rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al [U.S. 6320351] in view of Perhats [U.S. 6116513].

With respect to Claim 9, Ng discloses the vehicle electrical system as recited in Claim 1, wherein the integrated module has a terminal for connection to a generator [Fig. 7 element 16 shows a generator connected to the battery monitor/ power management module via contact 30A and input 50A], and wherein one of the battery master switch and the fuse is situated between the battery and the terminal of the integrated module [Ng Fig. 7 shows connection of the battery monitor/ power management module to the battery positive terminal through connections 50A and contact 30A]. However, Ng does not disclose a battery master switch and a fuse.

Perhats [U.S. 6116513] discloses a vehicle electrical system comprising: one of a battery master switch and a fuse [Fig. 5 element 74 shows an auto reset breaker that is inherently both a fuse and switch and can be considered a master switch because of its direct connection to the battery]. Perhats [Fig. 5] also shows circuit breaker 74 between the battery and SPST relay 86. I.e. Perhats' circuit [Fig. 5, from battery 12 to SPST 88] can clearly be used to replace Ng's circuit [Fig. 7], from battery 12A to latching relay 30A, for the purpose of integrating Perhats' circuit breaker into Ng's integrated module.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a battery master switch and a fuse [protective circuit breaker], to Ng.

The suggestion/ motivation for doing so would have been to provide a means of switched overload protection for the loads supplied by the battery monitor/ power management integrated module. As is well known in the art, using a battery master switch also has the advantage of completely isolating the loads from the source, which would prevent unnecessary drainage of the battery.

Claims 11 and 12 are rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al [U.S. 6320351] in view of Kelwaski [U.S 2003/0107863].

With respect to Claims 11 and 12, Ng discloses the vehicle electrical system as recited in Claim 1. Ng does not disclose a communications interface for the integrated module, or that the communications interface is a bus interface.

Kelwaski [U.S. 2003/0107863] discloses a vehicle electrical system comprising: a communications interface [Fig. 5 CAN controllers 63 and 64 are connected by 18 J1939

Drive Train data link; a known communications bus interface] for the integrated module; wherein the control unit for power management is in contact with at least one of the plurality of loads of the vehicle electrical system and an additional control unit of the vehicle via the communications interface for the integrated module [page 3 paragraph [0029] lines 4-10; and Fig. 4 elements 18, 24, and 37].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a configurable interrupter for circuit overcurrent communications bus interface to Ng.

The suggestion/ motivation for doing so would have been to increase the speed, bandwidth, and efficiency of communication between the power management unit, controllers, and the loads.

Claim 13 is rejected under 35 U.S.C. 103[a] as being unpatentable over Perhats [U.S. 6116513] as applied to claim 9 above, and further in view of Larson [U.S. 6690140].

With respect to Claim 13, Ng discloses the vehicle electrical system as recited in Claim 1, as well as an electrical generator [Fig. 7 element 16] that recharges battery 12A. Perhats discloses the vehicle electrical system, as recited in Claim 9.

Ng and Perhats do not disclose that the integrated module further includes an electronics unit for at least one of regulation and diagnosis of the generator.

Larson [U.S. 669140] discloses the vehicle electrical system wherein the integrated module further includes an electronics unit for at least one of regulation and diagnosis of the generator [col. 3 lines 43-53 describes how ESC 30, in combination

with other controllers, execute a battery management program that regulates and diagnoses the battery/ pack by making adjustments to the generator output. Since the battery is directly connected to the generator, the generator output is also effectively diagnosed.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a battery master switch and a fuse [protective circuit breaker] to Ng.

The suggestion/ motivation for doing so would have been to provide a means for the vehicle electrical system to regulate and diagnose the battery/ generator, and so increase/ decrease the rate of charging as required. This is a necessary requirement for any type of vehicle that could conceivably impact human safety [such as today's automobiles] or lead to equipment damage [an overcharged battery could result in an explosion].

Claims 14 and 15 are rejected under 35 U.S.C. 103[a] as being unpatentable over Ng in view of McRoberts [U.S. 4965461] as applied to claim 5 and claim 7, respectively, and further in view of Kelwaski [U.S. 2003/0107863].

With respect to Claim 14, Ng and McRoberts disclose the vehicle electrical system as recited in Claim 1 and Claim 5, respectively. With respect to Claim 15, Ng and McRoberts also disclose the vehicle electrical system as recited in Claim 1 and Claim 7, respectively. Ng and McRoberts do not disclose a detection arrangement for diagnosis of a state of at least one of the fuses.

Kelwaski discloses that the integrated module further includes a detection arrangement for diagnosis of a state of at least one of the fuses [page 3, paragraph [0025], lines 1-6].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a state-of-fuse detection arrangement to Ng as modified by McRoberts.

The suggestion/ motivation for doing so would have been to enable the electronics unit to absolutely determine whether a de-energized power bus [no battery voltage or power output from the generator] was the result of a defective battery/ generator, or an open in the line, such as a blown fuse. Thus "fuse-state sensing" would allow the electronics unit [or a technician] to be more effective in diagnosing malfunctions.

Claim 16 is rejected under 35 U.S.C. 103[a] as being unpatentable over Ng et al [U.S. 6320351] in view of Baer [U.S.5701068].

With respect to Claim 16, Ng discloses the vehicle electrical system as recited in claim 1. Ng does not disclose that the integrated module includes a DC-DC converter.

Baer [US-5701068] discloses a vehicle electrical system wherein the integrated module further includes a DC-DC converter [Fig. 2 DC charger 70 includes a DC-DC converter]. In this case, Baer's [Fig. 2] equivalent integrated module would consist of DC charger 70 and sensor node 200 [as the battery monitor unit] and CPU 20, as the power management unit, with the DC-DC converter shown integrated into the battery charger.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add a DC-DC converter to Ng.

The suggestion/ motivation for doing so would have been to increase the charging capacity of the generator-battery system, since it is well known that DC-DC converters are capable of multiple [and if needed variable] voltage outputs, with a higher amperage supply capacity than a regular generator. This would be useful for battery management systems on electrical vehicles with large battery packs.

With respect to Claim 17 and Claim 18, Ng discloses the vehicle electrical system as recited in Claim 1, as well as a plurality of loads [Fig. 7, loads 20, 22, and 24]. Ng does not disclose an integrated module with at least one circuit breaker that enables selective connection and disconnection of one of a single load and a plurality of loads from the integrated module.

Perhats [U.S. 6116513] discloses a vehicle electrical system wherein the integrated module further includes at least one circuit breaker [Fig. 5 element 74 shows an auto reset breaker]. The circuit breaker further enables selective connection and disconnection of one of a single load and a plurality of loads from the integrated module [see Ng's plurality of loads Fig. 7 loads 20, 22, 24].

It has already been shown that Ng's battery voltage monitor and power management unit can be incorporated into a single module [see Claim 1 above]; using the same means, one of ordinary skill in the art can easily combine Perhats' circuit breaker 74 with Ng's battery voltage monitor/ power management module to produce applicant's Battery State of Charge Detection System, with at least one circuit breaker in

the integrated module to enables selective connection and disconnection of one of a single load and a plurality of loads.

The suggestion/ motivation for doing so would have been to produce an integral module capable of battery monitoring/ power management, with onboard protection that offer a convenient means of resetting from overload faults.

Response to Arguments

Applicant's arguments filed 02/27/2006 have been fully considered but they are not persuasive, in view of the above 35 U.S.C. 102 and 35 U.S.C 103 rejections.

Applicant argues Ng shows no module arrangement- the module arrangement, per Claim 1, is given by Ng in [Fig. 7, the combination of battery voltage monitor 36 and power management unit 38 modules; that they are individual modules is *implicitly understood*; also see paragraph on integrated module in the response to Claim 1]. All the other components not in Ng's module are taught by the secondary references, which are combined with proper obviousness type motivations.

Applicant argues Ng shows no arrangement for measuring the battery current that are included in a module- this is correct. The arrangement for measuring the battery current was taught by Larson, [Abstract, lines 13-16 refers to instrumentation, and Fig. 1, gauge cluster 14], as previously specified in the first Detailed Action, and reiterated again in the Claim 1 response above. Proper motivation to combine Ng with Larson is as stated above.

Applicant argues the load-disconnect switch connected to the positive terminal of the battery in not a component of the module. This is not taught by Ng, it is taught by McRoberts, who teaches a battery-disconnecting switch and a battery-disconnecting fuse [Fig. 2, switches 66, 68, and 70 connected to fuse block 64] shown in one module [Fig. 2, control system 14]. Proper motivation to combine Ng and McRoberts is as stated above.

Applicant argues that Larson's battery voltage sensor 46 in Fig. 2 that supplies a signal to Body Controller Module 30 is used primarily for diagnostic purposes, and that the sensors mentioned in column 4 lines 52-54 are current sensors which measure current flowing into the battery and out of it, but not the battery voltage. Since applicant's Claim 1 does not require measurement of *battery voltage*, this argument is irrelevant.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard V. Muralidar whose telephone number is 571-272-8933. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl D. Easthom can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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RVM
6/02/2006

KARL EASTHOM
SUPERVISORY PATENT EXAMINER